

ABSTRACT OF THE DISCLOSURE

A flow conditioning apparatus, a separation system which includes the flow conditioning apparatus and cooperating downstream separation equipment, and a method of using the system are described. The system separates liquid components of differing densities from a fluid mixture. The flow conditioning apparatus includes an inlet, an outlet, and a swirl chamber extending along a swirl axis. The inlet and outlet cooperate with the swirl chamber to create a swirling of a fluid mixture passing through the swirl chamber to ideally induce coalescence of liquid droplets. The inlet and the outlet typically direct fluid to flow in a circumferential direction relative to the swirl axis to create a helical flow. The flow of the fluid mixture through the apparatus encounters a minimum of fluid shear and associated droplet dispersion. The enhanced quantity of droplets coalesced, or at least the quantity of pre-existing droplets entering the control apparatus which are not substantially dispersed by fluid shear, increases the efficiency of liquid separation by the cooperating downstream separation equipment.